USING PREDICTIVE TRAFFIC MODELING

BACKGROUND

This invention relates generally to techniques for routing traffic.

A large amount of traffic information is available from a variety of sources. This information may be used by drivers to attempt to select from among a variety of potential routes to travel to a given destination. However, this traffic information tends to become outdated, often by the time the operator reaches locations that were expected to be either congestion-free or congested. Moreover, traffic patterns are dynamic. For example, a problem in one area may cause a large number of drivers to use an alternative route, creating a problem in another area.

Thus, existing techniques for disseminating traffic information (e.g., radio and television broadcasts) are largely ineffective in part because they do not account for the dynamic nature of traffic patterns. Existing techniques may cause some problems because drivers alerted to a problem in one area may cause congestion in another area, even after the problem that originally caused the diversion is long past.

Other factors that tend to lessen the effectiveness of existing traffic information techniques are the lack of sufficient detail. Also, there are usually not enough drivers that react to the information. Finally, it is believed that computation is important to assess each driver's impact and to present rational alternatives.

Thus, there is a continuing need for a traffic routing system that is capable of adapting to the dynamic nature of traffic patterns.

SUMMARY

In accordance with one aspect of the present invention, a method of routing traffic includes developing at least two potential routes using a processor based system. The system is then used to apply a predictive model to select one of the routes.

DESCRIPTION OF THE DRAWINGS

FIG. **1** is a block diagram depiction of a traffic routing system in accordance with one embodiment of the invention;

FIG. **2** is a block depiction of a receiver shown in FIG. **1**;

FIG. **3** is a display of a graphical user interface, which may be used in connection with the receiver shown in FIG. **2**;

FIG. **4** is a flow chart for implementing one embodiment of the present invention;

FIG. **5** is a flow chart for implementing a specific application of the software illustrated by FIG. **4**;

FIG. **6** is a drawing showing the conversion of one segment into two segments;

FIG. **7** is a flow chart for software implementing one embodiment of a predictive model useful in conjunction with the present invention; and

FIG. **8** is a graphical user interface that may be used in conjunction with one embodiment of the present invention.

DETAILED DESCRIPTION

Referring to FIG. **1**, a traffic routing system may include a server **10**, which communicates with a plurality of traffic information sensors **12**. The sensors may be, for example, sensors in particular vehicles that sense vehicular position.

In another embodiment, sensors may be placed in or along different roadways to determine the amount of traffic and the speed of that traffic. Alternatively, the sensors **12** may be video cameras that are placed at strategic locations to provide information about traffic congestion and traffic speeds.

The server **10** also receives traffic information from a traffic database **14**, which may include reports of existing traffic patterns, as well as historical information about how traffic varies under different conditions and over different times. Finally, the server **10** may also receive information from a predictive model server **16**, which predicts, based on the existing conditions, how traffic conditions will vary during a future time interval. All of this information may then be transmitted by the server **10** to a plurality of receivers **18**, which may be located in individual vehicles.

The transmission system between the server **10** and the vehicles **18** may, for example, be implemented using cellular telephone technology, i.e., each of the receivers **18** may include a cellular transceiver which receives information from the server **10** and transmits information back to the server **10**. For example, each vehicle may transmit requests for routing information together with information about its current position, which may be used by the server to develop information about how a particular vehicle is maneuvering through traffic. This data from individual vehicles may be added to the traffic database **14** and combined with a variety of other information, including information from other vehicles, to develop information about the current traffic conditions. Of course, other distribution techniques may be used, including conventional radio frequency communications and communications through transmitters located in the roadways, as additional examples.

The communication links between the servers **10** and the variety of receivers **18** need not be maintained continuously open in some embodiments. For example, a receiver **18***b* may transmit a short communication to a server **10**, indicating its current position and requesting a route to a given destination. The communication link may then be disconnected. A server **10**, having received a request and the appropriate address to communicate with the receiver **18** may, once the information is available at the server, contact the particular receiver **18**, provide the information, and then disconnect the communication link.

Referring now to FIG. **2**, a receiver **18** may include a processor **20** which communicates with a memory **22**. The memory **22** may store software, including the mapping software **23**. The mapping software **23** may be conventional software which takes coordinates and converts those coordinates into graphical depictions on a map display. For example, the coordinates may be overlaid over an appropriate map to show the position of the vehicle or a destination position.

The processor **20** also communicates with a transceiver **26** and the antenna **28**, for example, to implement a radio frequency based system, e.g., a cellular communication system. The processor **22** may communicate with a display **24** and a keypad **25**.

The processor **20** may also receive information from a position location system. A variety of conventional position location systems may be used. In one embodiment of the present invention, a global positioning system (GPS) receiver **30** may be provided with an antenna **32** to receive GPS signal information and provide such information about the vehicle's current position to the processor **20**. That information can, for example, be transmitted by the transceiver **26** and the antenna **28** to a server **10**.